

CLAIMS

What is claimed is:

1. An optical system comprising:
 - at least a first light emitting diode;
 - a transparent member having a first surface, a second surface, and an exit surface, the first light emitting diode disposed on the first surface of the transparent member, wherein a reflective coating is disposed on a portion of the first surface of the transparent member between the first light emitting diode and the exit surface of the transparent member; and
 - one of a second light emitting diode and a reflective coating disposed on the second surface of the transparent member;wherein the transparent member is shaped such that light emitted from the at least one light emitting diode is directed toward the exit surface of the transparent member.
2. The optical system of Claim 1, wherein the first light emitting diode has a surface that is coupled to the first surface of the transparent member, the surface of the first light emitting diode having a width, wherein the portion of the first surface of the transparent member between the first light emitting diode and the exit surface of the transparent member extends a distance that is greater than the width of the surface of the first light emitting diode.
3. The optical system of Claim 1, wherein the second surface of the transparent member is coated with a reflective coating, the device further comprising:
 - a third surface of the transparent member;
 - a fourth surface of the transparent member coated with a material reflective of light emitted from the first light emitting diode; and
 - a second light emitting diode disposed on the third surface of the transparent member;wherein the first and third surfaces of the transparent member form a wedge with an apex opposite the exit surface, and the second and fourth surfaces are substantially parallel.
4. The optical system of Claim 1, the transparent member comprising:
 - a first optical element coupled to the first light emitting diode, the first optical element having an exit surface; and

a second optical element having an entrance surface that is coupled to the exit surface of the first optical element, the second optical element having a surface that is the exit surface of the transparent member.

5. The optical system of Claim 4, further comprising a wavelength-converting material disposed between the first optical element and the second optical element.

6. The optical system of Claim 1, wherein the first surface of the transparent member and the second surface of the transparent member form a wedge with an apex opposite the exit surface.

7. The optical system of Claim 6, wherein the wedge has at least one non-planar surface.

8. The optical system of Claim 1, further comprising an image panel upon which light emitted from the exit surface of the transparent member is incident.

9. The optical system of Claim 8, further comprising at least one of a lens and an integrator rod disposed between the image panel and the exit surface of the transparent member.

10. The optical system of Claim 1, further comprising a plurality of light emitting diodes disposed on the first surface of the transparent member, wherein the reflective coating is disposed on the portion of the first surface of the transparent member between any light emitting diode and the exit surface of the transparent member.

11. The optical system of Claim 1, wherein the transparent member is selected from the group consisting of sapphire, glass, acrylic, and silicone.

12. An optical system comprising:
a first light emitting diode;

a first transparent member having a first surface, a second surface, and a first exit surface, the first light emitting diode disposed on the first surface, the first surface and second surface being opposite and non-parallel;

one of a second light emitting diode and a reflective coating disposed on the second surface; and

a second transparent member having a third surface, a fourth surface, an entry surface and a second exit surface, wherein the third surface and fourth surface are opposite and non-parallel and the entry surface and second exit surface are opposite, the entry surface is coupled to the first exit surface, a reflective coating is disposed on the third surface and the fourth surface;

wherein the first transparent member and second transparent member are shaped such that light emitted from the first light emitting diode is directed toward the second exit surface.

13. The optical system of Claim 12, wherein the first transparent member and second transparent member form a wedge with the first surface and second surface forming an apex opposite the second exit surface.

14. The optical system of Claim 13, wherein the wedge has at least one non-planar surface.

15. The optical system of Claim 12, wherein the first light emitting diode has a surface that is coupled to the first surface of the transparent member, the surface of the first light emitting diode having a width, wherein the third surface extends a distance between the entrance surface and the second exit surface that is greater than the width of the surface of the first light emitting diode.

16. The optical system of Claim 12, further comprising a wavelength-converting material disposed between the first transparent member and the second transparent member.

17. The optical system of Claim 12, further comprising an image panel upon which light emitted from the second exit surface is incident.

18. The optical system of Claim 17, further comprising at least one of a lens and an integrator rod is disposed between the image panel and the second exit surface.

19. The optical system of Claim 12, further comprising a plurality of light emitting diodes disposed on the first surface.

20. The optical system of Claim 12, wherein the first transparent member and second transparent member are selected from the group consisting of sapphire, glass, acrylic, and silicone.

21. An optical system comprising:

a first light emitting diode; and

a wedge defined by the first light emitting diode along a first surface, a second inwardly reflective surface and a third inwardly reflective surface that are opposite each other and adjacent to the first surface, and a fourth inwardly reflective surface that is opposite and non-parallel with the first surface;

wherein the wedge is shaped such that light emitted from the first light emitting diode is directed toward an exit area defined by a wide end of the wedge.

22. The optical system of Claim 21, wherein the first surface and fourth inwardly reflective surface form an apex of the wedge that is opposite the exit area.

23. The optical system of Claim 21, wherein at least a portion of the fourth inwardly reflective surface is formed by a second light emitting diode.

24. The optical system of Claim 21, wherein at least a portion of the first surface between the first light emitting diode and the exit area is reflective.

25. The optical system of Claim 24, wherein the wedge comprises a transparent member wherein the second inwardly reflective surface and third inwardly reflective surface are

surfaces of the transparent member coated with a material reflective of light emitted from the first light emitting diode

26. The optical system of Claim 21, further comprising a plurality of light emitting diodes disposed along the first surface.

27. The optical system of Claim 21, wherein the second inwardly reflective surface and third inwardly reflective surface are approximately perpendicular to the first surface.

28. The optical system of Claim 21, wherein the wedge is defined as a cavity within solid body.

29. The optical system of Claim 21, wherein the second inwardly reflective surface, third inwardly reflective surface and fourth inwardly reflective surface are separate reflective elements that are coupled together.